

Historic, Archive Document

Do not assume content reflects current scientific knowledge, policies, or practices.

aTD224
.W2W37

States
ment of
ture

Natural
Resources
Conservation
Service

Washington Basin Outlook Report February 1, 1998



Basin Outlook Reports and Federal - State - Private Cooperative Snow Surveys

For more water supply and resource management information, contact:

Local Natural Resources Conservation Service Field Office

or

Scott Pattee

Water Supply Specialist

Natural Resources Conservation Service

2021 E. College Way, Suite 214

Mt. Vernon, WA 98273-2873

(360) 428-7684

or

Chris Bieker

Public Affairs Specialist

Natural Resources Conservation Service

316 W. Boone Ave., Suite 450

Spokane, WA 99201-2348

(509) 323-2912

How forecasts are made

Most of the annual streamflow in the western United States originates as snowfall that has accumulated in the mountains during the winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Measurements of snow water equivalent at selected manual snow courses and automated SNOTEL sites, along with precipitation, antecedent streamflow, and indices of the El Niño / Southern Oscillation are used in computerized statistical and simulation models to prepare runoff forecasts. These forecasts are coordinated between hydrologists in the Natural Resources Conservation Service and the National Weather Service. Unless otherwise specified, all forecasts are for flows that would occur naturally without any upstream influences.

Forecasts of any kind, of course, are not perfect. Streamflow forecast uncertainty arises from three primary sources: (1) uncertain knowledge of future weather conditions, (2) uncertainty in the forecasting procedure, and (3) errors in the data. The forecast, therefore, must be interpreted not as a single value but rather as a range of values with specific probabilities of occurrence. The middle of the range is expressed by the 50% exceedance probability forecast, for which there is a 50% chance that the actual flow will be above, and a 50% chance that the actual flow will be below, this value. To describe the expected range around this 50% value, four other forecasts are provided, two smaller values (90% and 70% exceedance probability) and two larger values (30%, and 10% exceedance probability). For example, there is a 90% chance that the actual flow will be more than the 90% exceedance probability forecast. The others can be interpreted similarly.

The wider the spread among these values, the more uncertain the forecast. As the season progresses, forecasts become more accurate, primarily because a greater portion of the future weather conditions become known; this is reflected by a narrowing of the range around the 50% exceedance probability forecast. Users should take this uncertainty into consideration when making operational decisions by selecting forecasts corresponding to the level of risk they are willing to assume about the amount of water to be expected. If users anticipate receiving a lesser supply of water, or if they wish to increase their chances of having an adequate supply of water for their operations, they may want to base their decisions on the 90% or 70% exceedance probability forecasts, or something in between. On the other hand, if users are concerned about receiving too much water (for example, threat of flooding), they may want to base their decisions on the 30% or 10% exceedance probability forecasts, or something in between. Regardless of the forecast value users choose for operations, they should be prepared to deal with either more or less water. (Users should remember that even if the 90% exceedance probability forecast is used, there is still a 10% chance of receiving less than this amount.) By using the exceedance probability information, users can easily determine the chances of receiving more or less water.

The United States Department of Agriculture (USDA) prohibits discrimination in its programs on the basis of race, color, national origin, sex, religion, age, disability, political beliefs and marital or familial status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

To file a complaint, write the Secretary of Agriculture, U.S. Department of Agriculture, Washington, D.C., 20250, or call 1-800-245-6340 (voice) or (202) 720-1127 (TDD). USDA is an equal employment opportunity employer.

Washington Water Supply Outlook

February 1998

General Outlook

Washington made up a lot of ground in January. Above normal snowpack and precipitation accumulation during January helped to bring most of the state's snowpack to near normal by February 1. The water-year precipitation is slightly above average overall. The first week of February has brought unseasonably warm temperatures and dry conditions. Making winter sports a little more challenging than most would like.

Snowpack

The February 1 statewide SNOTEL readings showed 107% of average; a dramatic increase from last month. Snowpack varied from 65% of average in the Nooksack River Basin to as high as 195% in the Colockum Creek area of Chelan County. Westside averages from SNOTEL, and February 1 snow surveys, included the North Puget Sound river basins with 93% of average, the Olympic Peninsula basins with 103%, and the Lewis-Cowlitz basins with 113% of average. Snowpack along the east slopes of the Cascade Mountains included the Yakima area with 112%, and the Wenatchee area with 110%. Snowpack in the Spokane River Basin remained below average at 81%, and the Pend Oreille River Basin, including Canadian data, had 90% of average. Maximum snow cover in Washington was at Jasper Pass in the Baker River Basin, with a water content of 64 inches. This site would normally have 58.8 inches of water content on February 1. The highest average in the state was Alpine Meadows SNOTEL in the Tolt River Basin with 209% of average.

BASIN	PERCENT OF LAST YEAR	PERCENT OF AVERAGE
Spokane	50	81
Newman Lake	62	110
Colville	75	101
Pend Oreille	66	90
Okanogan	64	96
Methow	59	102
Similkameen	62	85
Wenatchee	68	110
Chelan	69	107
Stemilt Creek	71	98
Yakima	60	112
Ahtanum Creek	59	92
Walla Walla	46	89
Cowlitz	63	109
Lewis	69	118
White	65	124
Green	55	89
Cedar	66	134
Snoqualmie	63	106
Skykomish	65	125
Skagit	62	104
Baker	81	111
Nooksack	61	65
Olympic Peninsula	88	103

Precipitation

During the month of January, the National Weather Service and Natural Resources Conservation Service climate stations showed above average precipitation for all basins in Washington. The highest percent of average in the state was at Salmon Meadows SNOTEL. Salmon Meadows reported 308% of average for a total of 5.7 inches. The average for this site is 1.85 inches for January. Averages for the water year varied from 121% of average in the Olympic Peninsula Basin to 88% in the Spokane and 89% in the Walla Walla river basin. The highest individual site average for the water year was 147% of average at Mt. Crag SNOTEL site near Quilcene, Washington.

RIVER BASIN	JANUARY PERCENT OF AVERAGE	WATER YEAR PERCENT OF AVERAGE
Spokane	114	98
Colville-Pend Oreille	130	94
Okanogan-Methow	152	101
Wenatchee-Chelan	142	111
Yakima	134	112
Walla Walla	113	88
Cowlitz-Lewis	126	116
White-Green	129	101
Central Puget Sound	114	104
North Puget Sound	110	103
Olympic Peninsula	167	121

Reservoir

Early season reservoir levels in Washington vary greatly due to specific watershed management practices required in preparation for winter collection. Reservoir storage in the Yakima Basin was 764,000 acre feet, or 119% of average. Storage at other reservoirs included Roosevelt at 67% of average and 93% of capacity; Banks Lake at 95% of average and 117% of capacity; and the Okanogan reservoirs with 141% of average for February 1. The power generation reservoirs included the following: Coeur d'Alene Lake, 104,500 acre feet, or 82% of average and 44% of capacity; Chelan Lake, 390,000 acre feet, 87% of average and 58% of capacity; and the Skagit River reservoirs at 95% of average and 71% of capacity.

BASIN	PERCENT OF CAPACITY	PERCENT OF AVERAGE
Spokane	44	82
Colville-Pend Oreille	70	96
Okanogan-Methow	83	141
Wenatchee-Chelan	58	87
Yakima	72	119
North Puget Sound	71	95

Streamflow

Most streams in the state are forecasted for near normal flows this summer. Forecasts vary from 120% of average for the American River near Nile, to 78% of average for the Spokane River near Post Falls. February forecasts for some Western Washington streams include: Cedar River near Cedar Falls, 88% of average; Green River, 84%; and the Dungeness River, 97%. Some Eastern Washington streams include the Yakima River near Parker, 95% of average; the Wenatchee River at Peshastin, 97%; and the Colville River at Kettle Falls, 82%. Volumetric forecasts are developed using current, historic, and average snowpack, precipitation and streamflow data collected and coordinated by organizations cooperating with NRCS. A beneficial fact sheet, "Interpreting Streamflow Forecasts", is available on the World Wide Web at <http://www.wcc.nrcs.usda.gov/factpub/factpub.html>

January reported streamflows varied from well above to well below average. The Kettle River at Laurier, had the highest flows at 170% of average; and the Similkameen River at Nighthawk, with 64% of average, had the lowest in the state. Other streamflows were the following percentage of average: the Priest River, 97%; the Columbia at the International Boundary, 118%; the Spokane at Spokane, 87%; the Columbia below Rock Island Dam, 105%; the Cle Elum River near Roslyn, 65%; and the Snake River below Ice Harbor Dam, 85%.

BASIN	PERCENT OF AVERAGE MOST PROBABLE FORECAST (50 PERCENT CHANCE OF EXCEEDENCE)
-------	---

Spokane	78-79
Colville-Pend Oreille	79-110
Okanogan-Methow	86-104
Wenatchee-Chelan	92-99
Yakima	93-120
Walla Walla	91-103
Cowlitz-Lewis	93-105
Green River	83
Central Puget Sound	80-88
North Puget Sound	97-100
Olympic Peninsula	97

STREAM	PERCENT OF AVERAGE JANUARY STREAMFLOWS
--------	---

Pend Oreille Below Box Canyon	92
Kettle at Laurier	170
Columbia at Birchbank	118
Spokane at Long Lake	91
Similkameen at Nighthawk	64
Okanogan at Tonasket	147
Methow at Pateros	114
Chelan at Chelan	130
Wenatchee at Pashastin	77
Yakima at Cle Elum	62
Yakima at Parker	65
Naches at Naches	68
Yakima at Kiona	85
Grande Ronde at Troy	80
Snake below Lower Granite Dam	92
SF Walla Walla near Milton Freewater	130
Columbia at The Dalles	98
Lewis at Ariel	126
Cowlitz below Mayfield Dam	98
Skagit at Concrete	91

For more information contact your local Natural Resources Conservation Service office.

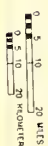
FEBRUARY 1998

4

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
WASHINGTON STATE OFFICE, SPOKANE



NRCS SNOTEL Sites Washington 1998



- LEGEND**
- BASIN BOUNDARY
 - SNOTEL DATA SITES
 - CITIES



Natural Resources Conservation Service

Washington State
Snow, Water and Climate Services

Contact List

Frank Easter
Acting State Conservationist
W. 316 Boone Ave., Suite 450
Spokane, WA 99201-2348
phone: 509-323-2961
fax: 509-323-2979
feaster@wal.wa.nrcs.usda.gov

Chris Bieker
Public Affairs Specialist
W. 316 Boone Ave., Suite 450
Spokane, WA 99201-2348
phone: 509-323-2912
fax: 509-323-2909
cbieker@wal.wa.nrcs.usda.gov

Scott Pattee
Water Supply Specialist
2021 E. College Way, Suite 214
Mount Vernon, WA 98273-2873
phone: 360-428-7684
fax: 360-424-6172
spattee@cio.net

Chris Pacheco
Resource Conservationist
National Water and Climate Center
101 SW Main St., Suite 1600
Portland, OR 97204-3224
phone: 503-414-3056
fax: 503-414-3101
cpacheco@wcc.nrcs.usda.gov

Helpful Internet Addresses

NRCS Snow Survey and Climate Services Homepages

Washington:

<http://wcp.wsu.edu/nrcs/CoopSnoSrvy.htm>

Oregon:

<http://crystal.or.nrcs.usda.gov/snowsveys/>

Idaho:

<http://id.nrcs.usda.gov/snow/snow.htm>

National Water and Climate Center (NWCC):

<http://www.wcc.nrcs.usda.gov/>

NWCC Anonymous FTP Server:

<ftp.wcc.nrcs.usda.gov>

USDA-NRCS Agency Homepages

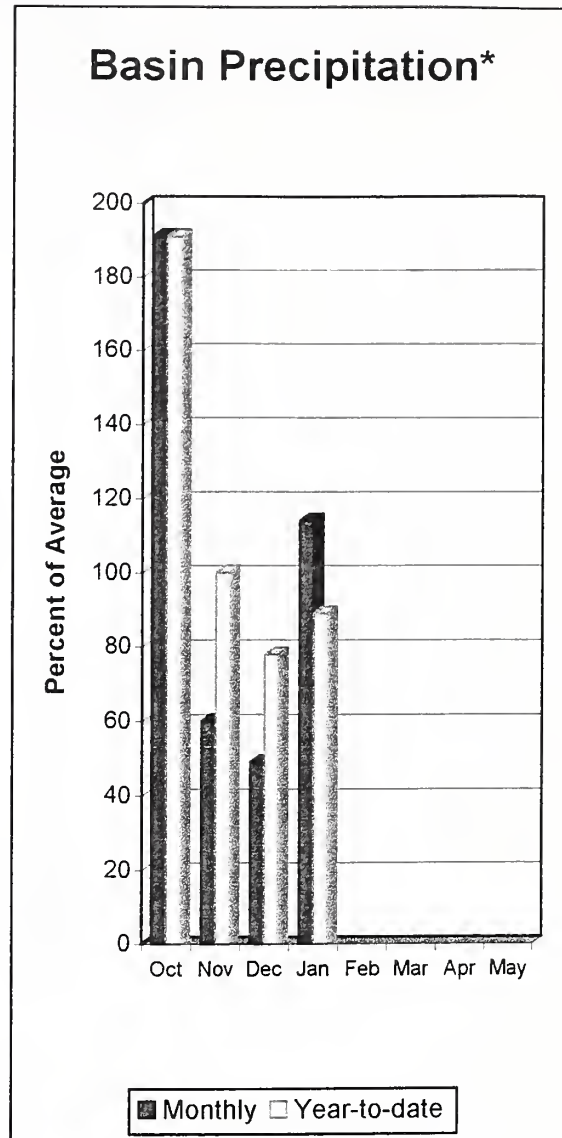
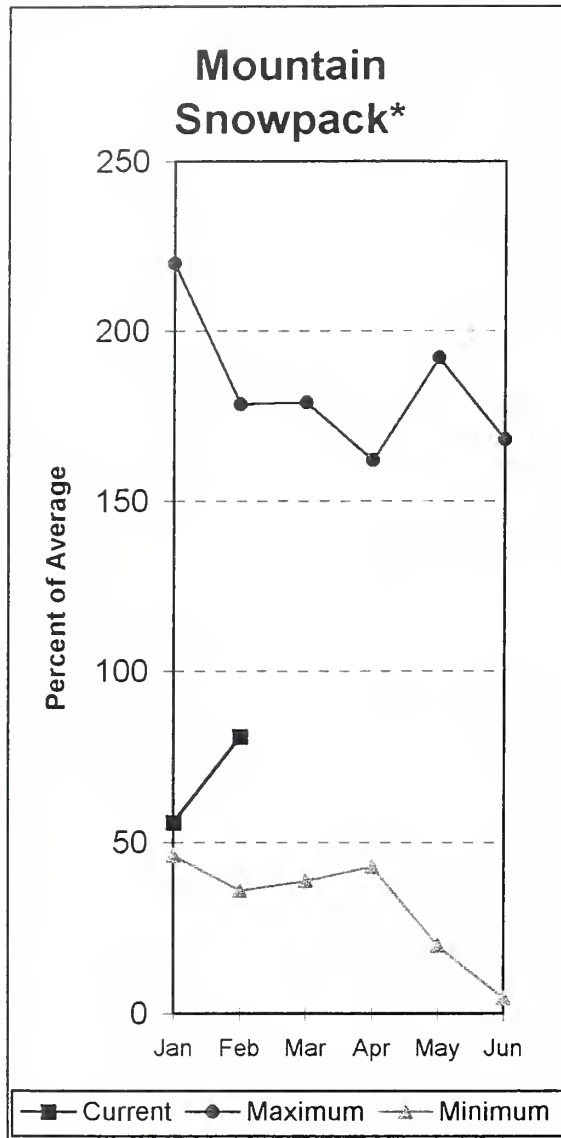
Washington:

<http://wcp.wsu.edu/nrcs/>

NRCS National:

<http://www.ftw.nrcs.usda.gov/>

Spokane River Basin



*Based on selected stations

The February 1 forecasts for summer runoff within the Spokane River Basin are 78% of average near Post Falls and 79% of average at Long Lake. The forecast is based on a basin snowpack that is 81% of average and precipitation that is 89% of average for the water year. Precipitation for January was above normal at 114% of average. Streamflow on the Spokane River at Long Lake, was 91% of average for January. February 1 storage in Coeur d'Alene Lake, was 104,500 acre feet, 82% of average, and 44% of capacity. Snowpack at Quartz Peak SNOTEL site contained 14.6 inches of water, compared to the average February 1 reading of 14.0 inches. Average temperatures in the Spokane basin were 3 degrees above normal.

For more information contact your local Natural Resources Conservation Service office.

Spokane River Basin

Streamflow Forecasts - February 1, 1998

SPOKANE near Post Falls (2)	APR-SEP	1461	1853	2120	78	2387	2779	2731
	APR-JUL	1400	1787	2050	78	2313	2700	2633
SPOKANE at Long Lake	APR-JUL	1635	2049	2330	79	2611	3025	2936
	APR-SEP	1796	2224	2515	80	2806	3234	3159

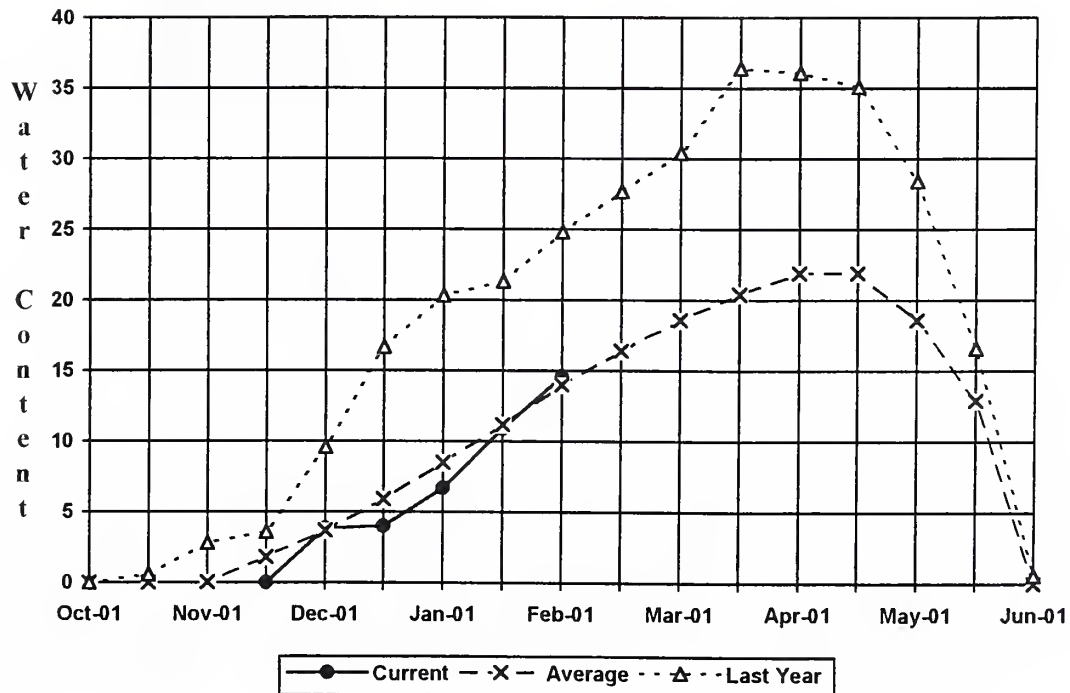
SPOKANE RIVER BASIN Reservoir Storage (1000 AF) - End of January					SPOKANE RIVER BASIN Watershed Snowpack Analysis - February 1, 1998			
Reservoir	Usable Capacity	*** Usable Storage This Year	*** Usable Storage Last Year	*** Usable Storage Avg	Watershed	Number of Data Sites	This Year as % of Last Yr	% of Average
COEUR D'ALENE	238.5	104.5	116.5	127.8	SPOKANE RIVER	11	50	81
					NEWMAN LAKE	2	62	110

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

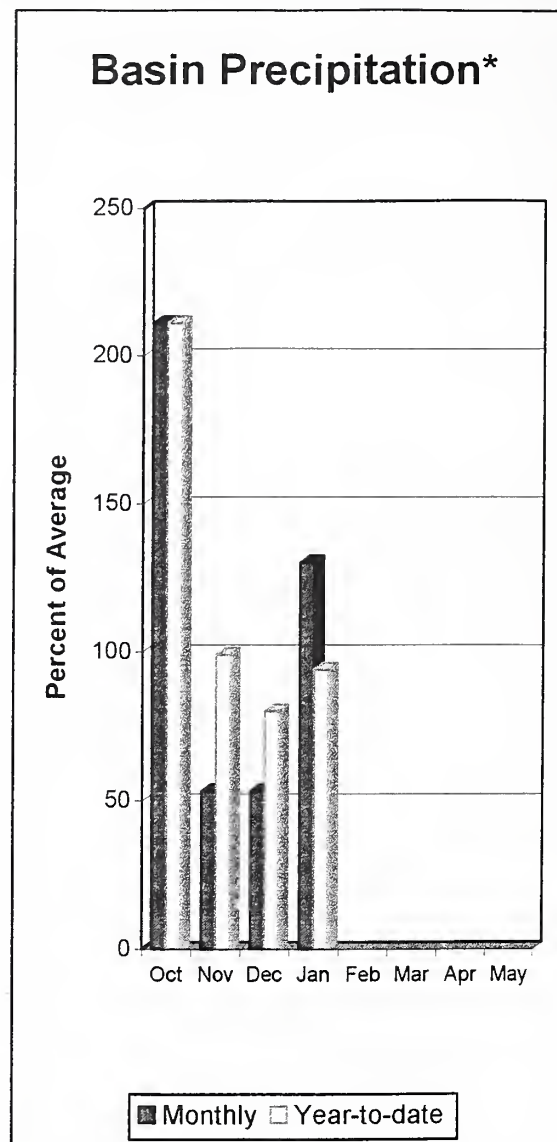
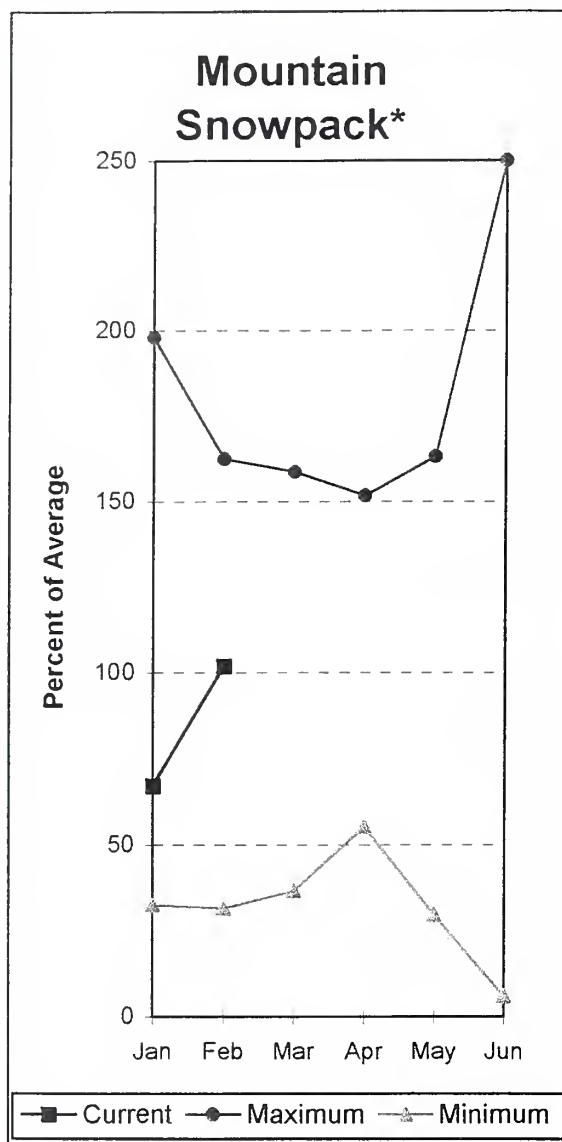
The average is computed for the 1961-1990 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
 (2) - The value is natural flow - actual flow may be affected by upstream water management.

Quartz Peak SNOTEL Elevation 4700 ft.



Colville - Pend Oreille River Basins



*Based on selected stations

The forecast for the Kettle River streamflow is 110% of average; the Pend Oreille below Box Canyon, 79%; and the Priest River near the town of Priest River, 86% of average for the summer runoff period. January streamflow was 92% of average on the Pend Oreille River; 118% on the Columbia at the International Boundary; and 170% on the Kettle River. February 1 snow cover was 82% of average in the Pend Oreille Basin and 103% of average in the Kettle River Basin. Precipitation during January was 130% of average, bringing the year-to-date precipitation to 94% of average. Reservoir storage in Roosevelt and Banks lakes was reported to be 96% of average and 70% of capacity on February 1. Average temperatures were 2-3 degrees above normal.

For more information contact your local Natural Resources Conservation Service office.

Colville - Pend Oreille River Basins

Streamflow Forecasts - February 1, 1998

Forecast Point	Forecast Period	<<----- Drier ----- Future Conditions ----- Wetter ----->>						
		Chance Of Exceeding *		Chance Of Exceeding *		Chance Of Exceeding *		30-Yr Avg. (1000AF)
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
PEND OREILLE Lake Inflow (1,2)	APR-JUL	6578	9206	10400	79	11594	14222	13150
	APR-SEP	7120	9995	11300	79	12605	15480	14370
	APR-JUN	5392	7873	9000	79	10127	12608	11390
PRIEST nr Priest River (1,2)	APR-JUL	432	620	705	87	790	978	814
	APR-SEP	458	659	750	86	841	1042	868
PEND OREILLE bl Box Canyon (1,2)	APR-JUL	7025	9415	10500	79	11585	13975	13380
	APR-SEP	7707	10315	11500	79	12685	15293	14590
	APR-JUN	6150	8206	9140	79	10074	12130	11570
CHAMOKANE CREEK near Long Lake	MAY-AUG	2.32	5.08	6.95	82	8.82	11.58	8.52
COLVILLE at Kettle Falls	APR-SEP	66	90	107	82	124	148	131
	APR-JUL	59	82	98	82	114	137	120
	APR-JUN	55	77	92	83	107	129	111
KETTLE near Laurier	APR-SEP	1665	1882	2030	110	2178	2395	1854
	APR-JUL	1598	1795	1930	110	2065	2262	1761
	APR-JUN	1454	1624	1740	110	1856	2026	1585

COLVILLE - PEND OREILLE RIVER BASINS Reservoir Storage (1000 AF) - End of January

COLVILLE - PEND OREILLE RIVER BASINS Watershed Snowpack Analysis - February 1, 1998

Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
ROOSEVELT		NO REPORT			COLVILLE RIVER	1	75	101
BANKS		NO REPORT			PEND OREILLE RIVER	67	50	82
					KETTLE RIVER	3	68	103

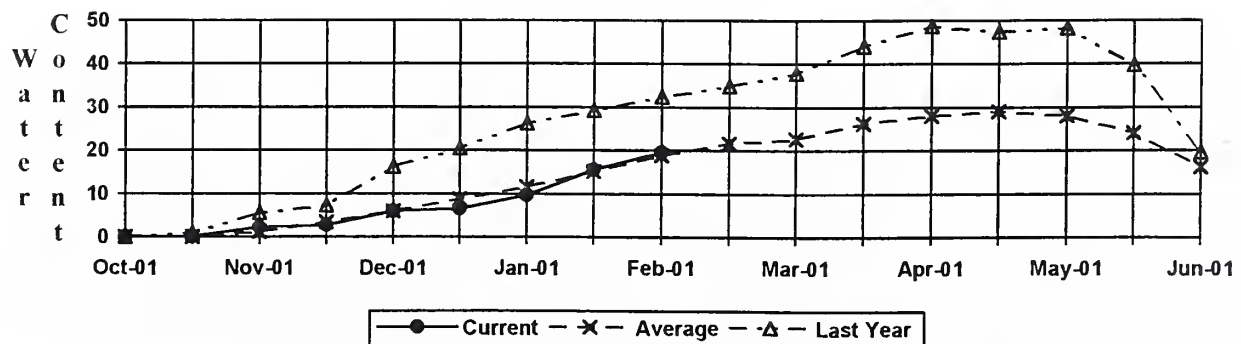
* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

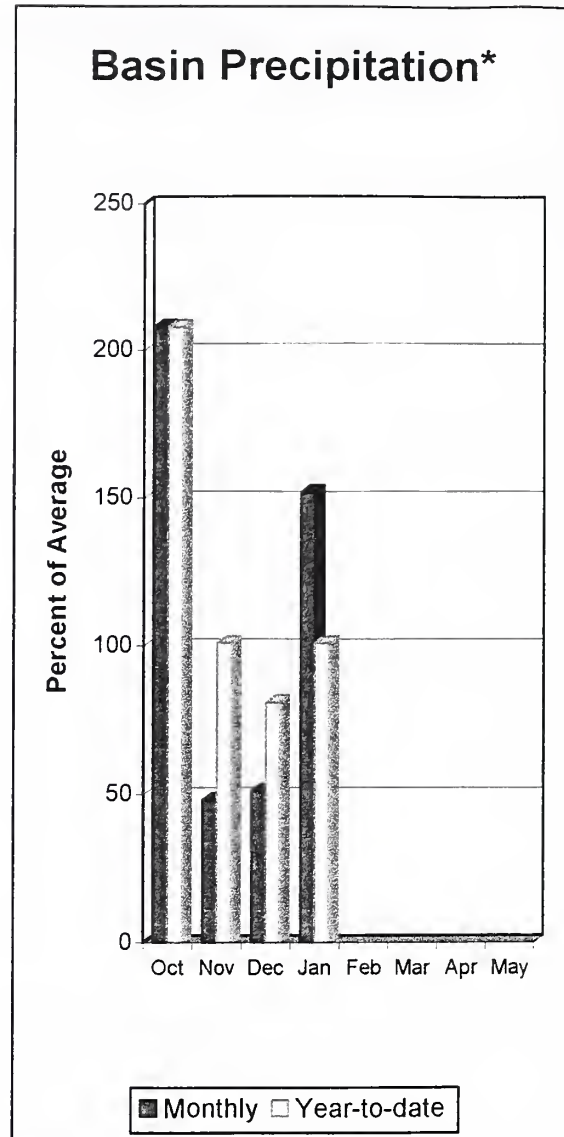
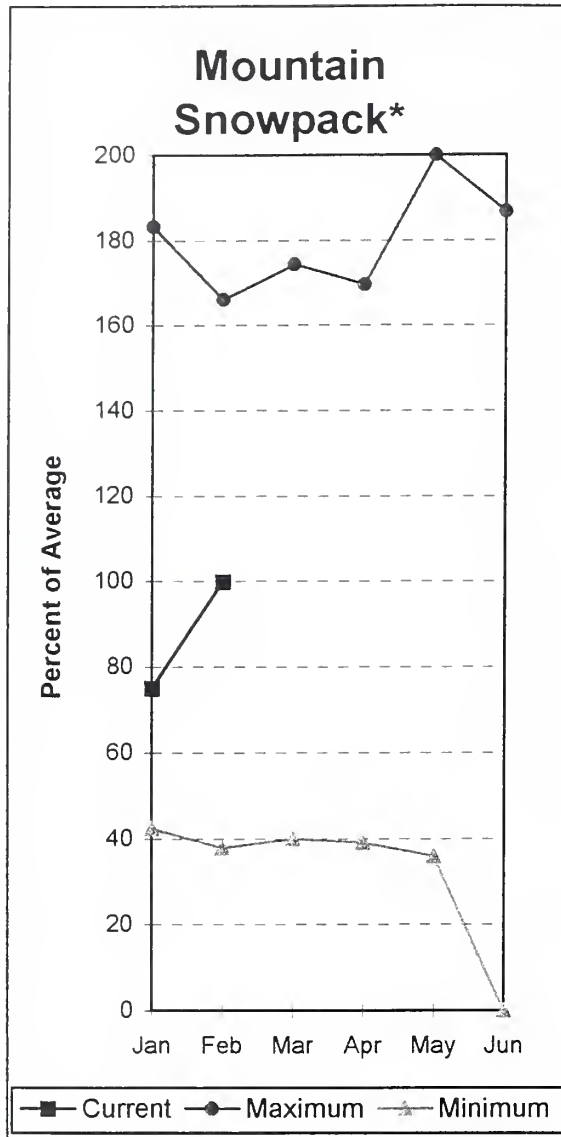
(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.

(2) - The value is natural flow - actual flow may be affected by upstream water management.

Bunchgrass Meadow SNOTEL Elevation 5000 ft.



Okanogan - Methow River Basins



*Based on selected stations

Summer runoff forecast for the Okanogan River is 86% of average; the Similkameen River, 87%; the Methow River, 99%; and Salmon Creek, 104% of average. February 1 snow cover on the Okanogan was 96% of average; the Methow, 102%; and the Similkameen River, 85%. Salmon Meadows SNOTEL site above Conconully Lake had a February 1 reading of 127% of average. January precipitation in the Okanogan-Methow was 152% of average, with precipitation for the water year at 101% of average. January streamflow for the Methow River was 114% of average; 147% for the Okanogan River; and 64% for the Similkameen. Snow-water-content at the Salmon Meadows SNOTEL, near Conconully, was 7.5 inches. Average for this site is 5.9 inches on February 1. Combined storage in the Conconully Reservoirs was 19,500 acre feet, which is 83% of capacity and 141% of the February 1 average.

For more information contact your local Natural Resources Conservation Service office.

Okanogan - Methow River Basins

Streamflow Forecasts - February 1, 1998

		<<----- Drier ----- Future Conditions ----- Wetter ----->>						
Forecast Point	Forecast Period	Chance Of Exceeding *						30-Yr Avg. (1000AF)
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
SIMILKAMEEN near Nighthawk (1)	APR-JUL	810	1033	1135	87	1237	1460	1304
	APR-SEP	900	1120	1220	87	1320	1540	1399
	APR-JUN	647	859	955	86	1051	1263	1113
OKANOGAN near Tonasket (1)	APR-JUL	555	1040	1260	86	1480	1965	1466
	APR-SEP	630	1156	1395	86	1634	2160	1623
	APR-JUN	477	878	1060	86	1242	1643	1233
SALMON CREEK near Conconully	APR-JUL	7.6	14.9	19.9	104	25	32	19.1
	APR-SEP	8.3	15.7	21	104	26	33	20
METHOW RIVER near Pateros	APR-SEP	740	853	930	99	1007	1120	942
	APR-JUL	693	795	864	99	933	1035	873
	APR-JUN	588	678	739	99	800	890	746

OKANOGAN - METHOW RIVER BASINS Reservoir Storage (1000 AF) - End of January

OKANOGAN - METHOW RIVER BASINS Watershed Snowpack Analysis - February 1, 1998

Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
SALMON LAKE	10.5	8.7	8.4	7.5	OKANOGAN RIVER	18	64	96
CONCONULLY RESERVOIR	13.0	10.8	9.0	6.3	OMAK CREEK	1	66	90
					SANPOIL RIVER	0	0	0
					SIMILKAMEEN RIVER	4	62	85
					CONCONULLY LAKE	3	51	101
					METHOW RIVER	5	59	102

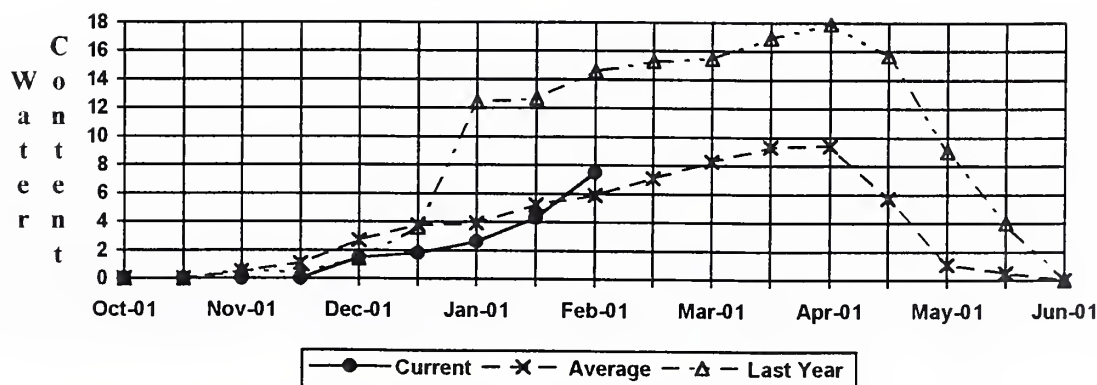
* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

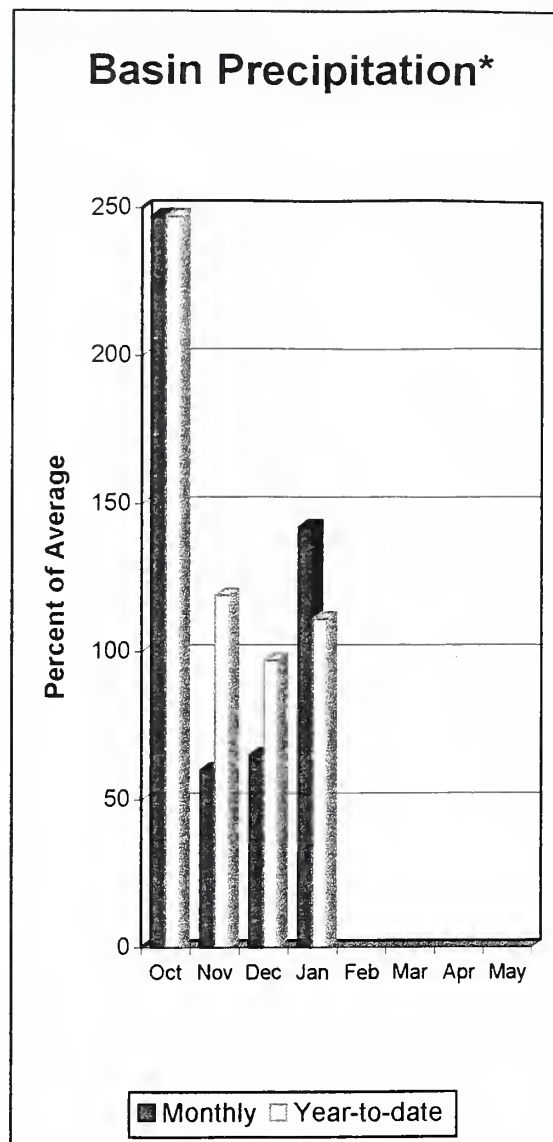
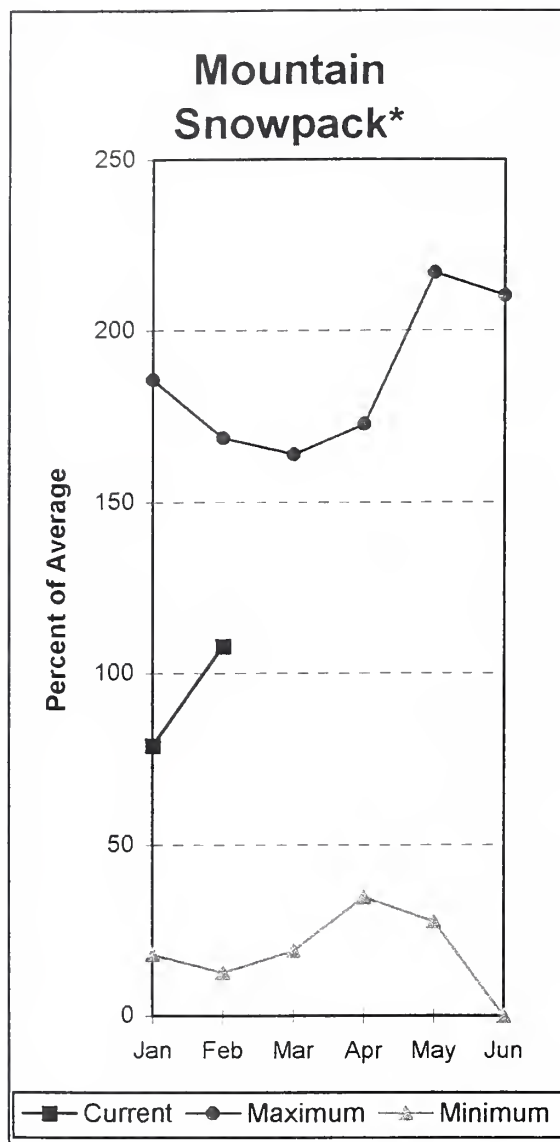
(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.

(2) - The value is natural flow - actual flow may be affected by upstream water management.

Salmon Meadows SNOTEL Elevation 4500 ft.



Wenatchee - Chelan River Basins



*Based on selected stations

Precipitation during January was 142% of average in the basin and 111% for the year-to-date. Runoff for the Entiat River is forecast to be 93% of average for the summer. The April-September forecast for the Chelan River is for 97% of average; for the Wenatchee River at Peshastin is 97%; and for the Stehekin it is 99% of average. Icicle, Stemilt and Squilchuck creeks are all expected to have near normal flows this summer. January streamflows on the Chelan River was 130% of average, and the Wenatchee River averaged 77% of normal flows. February 1 snowpack in the Wenatchee Basin was 110% of average. The Chelan Basin was 107% of average; Colockum Ridge was 195%; and Stemilt Creek was 98% of average. Snowpack in the Entiat River Basin was 110% of average. Reservoir storage in Lake Chelan was 390,000 acre feet, or 87% of February 1 average and 58% of capacity. Lyman Lake SNOTEL had the most snow water with 46 inches of water. This site would normally have 39 inches on February 1. Temperatures were slightly above normal for January.

For more information contact your local Natural Resources Conservation Service office.

Wenatchee - Chelan River Basins

Streamflow Forecasts - February 1, 1998

		<<===== Drier ===== Future Conditions ===== Wetter =====>>									
Forecast Point	Forecast Period	90% (1000AF)		70% (1000AF)		Chance Of Exceeding * 50% (Most Probable) (1000AF) (% AVG.)		30% (1000AF)		10% (1000AF)	30-Yr Avg. (1000AF)
CHELAN RIVER near Chelan	APR-SEP	943	1049	1120	97	1191	1297	1160			
	APR-JUL	841	930	990	97	1050	1139	1024			
	APR-JUN	662	738	789	97	840	916	812			
STEHEKIN near STEHEKIN	APR-SEP	706	774	820	99	866	934	827			
	APR-JUL	550	603	640	91	677	730	701			
	APR-JUN	454	499	530	99	561	606	538			
ENTIAT RIVER near Ardenvoir	APR-SEP	168	193	210	93	227	252	227			
	APR-JUL	152	175	190	92	205	228	206			
	APR-JUN	122	142	155	92	168	188	169			
WENATCHEE at Plain	APR-SEP	942	1048	1120	94	1192	1298	1190			
	APR-JUL	880	958	1010	94	1062	1140	1072			
	APR-JUN	721	777	815	94	853	909	864			
WENATCHEE R. at Peshastin	APR-SEP	1014	1351	1580	97	1809	2146	1636			
	APR-JUL	919	1223	1430	96	1637	1941	1485			
	APR-JUN	745	989	1155	96	1321	1565	1204			
STEMILT nr Wenatchee (miners in)	MAY-SEP	77	105	124	90	143	171	138			
ICICLE CREEK near Leavenworth	APR-SEP	277	301	317	92	333	357	344			
	APR-JUL	256	278	293	92	308	330	318			
	APR-JUN	205	228	244	93	260	283	263			

WENATCHEE - CHELAN RIVER BASINS Reservoir Storage (1000 AF) - End of January

Reservoir	Usable Capacity	*** Usable Storage ***		
		This Year	Last Year	Avg
		Year	Year	
CHELAN LAKE	676.1	390.0	288.3	450.6

WENATCHEE - CHELAN RIVER BASINS Watershed Snowpack Analysis - February 1, 1998

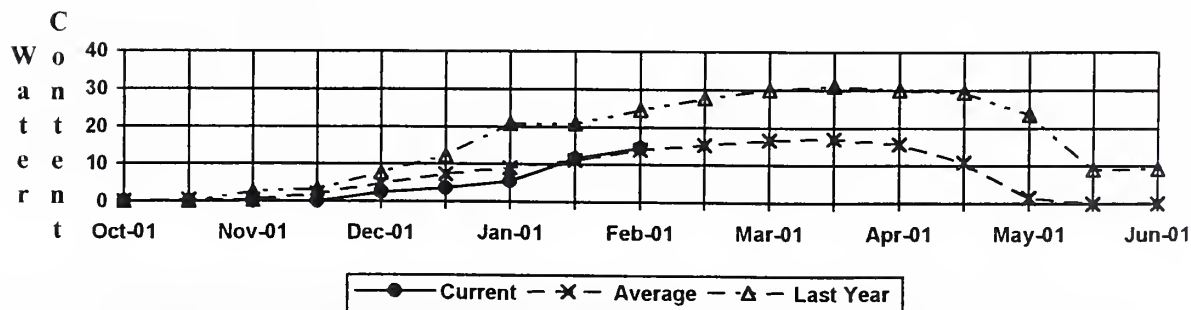
Watershed	Number of Data Sites	This Year as % of	
		Last Yr	Average
CHELAN LAKE BASIN	5	69	107
ENTIAT RIVER	2	60	110
WENATCHEE RIVER	13	68	110
SQUILCHUCK CREEK	0	0	0
STEMILT CREEK	2	71	98
COLOCKUM CREEK	1	102	195

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

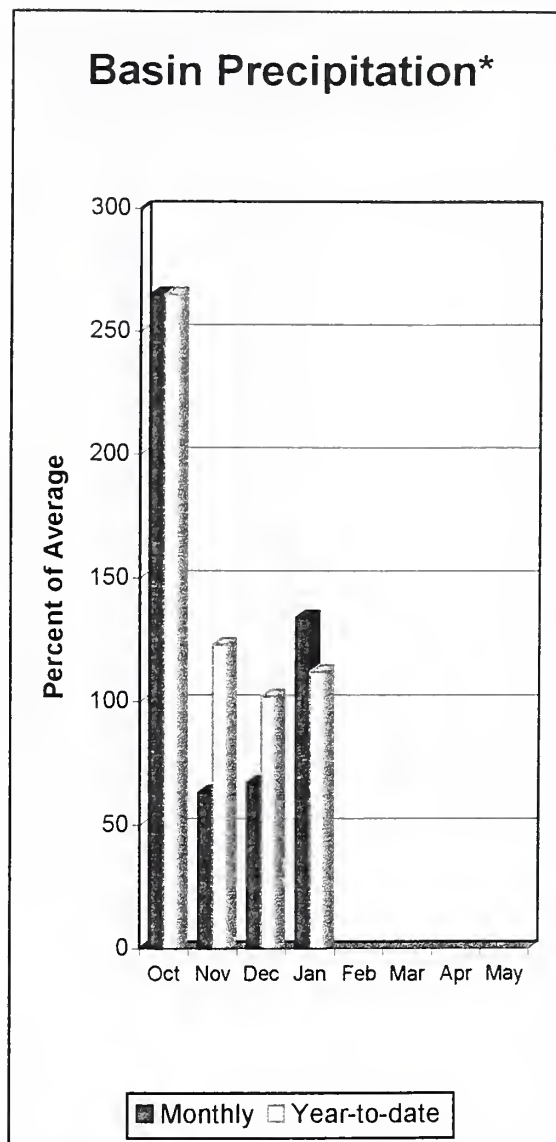
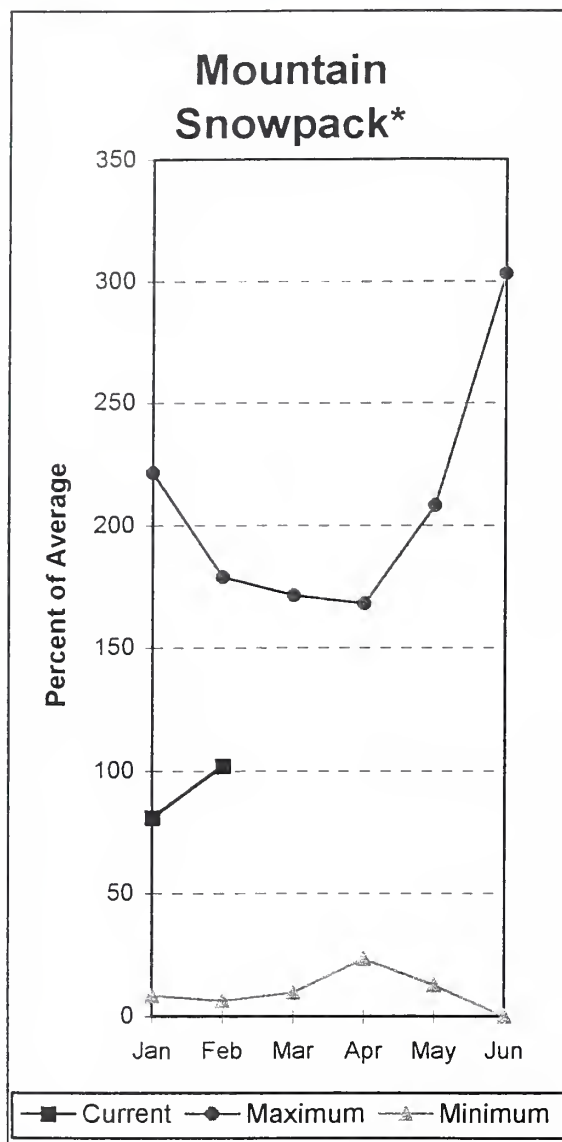
The average is computed for the 1961-1990 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
- (2) - The value is natural flow - actual flow may be affected by upstream water management.

Pope Ridge SNOTEL Elevation 3540 ft.



Yakima River Basin



*Based on selected stations

February 1 reservoir storage for the five major reservoirs was 764,000 acre feet, or 119% of average. February 1 summer streamflow forecasts are for near normal in the Yakima Basin. Forecasts for the Yakima River at Cle Elum, are for 93% of average; Naches River, 97%; the Yakima River near Parker, 95%; Ahtanum Creek, 96%; and the Tieton River, 97%. The Klickitat River near Glenwood is forecast at 105% of average flows this summer. Volume forecasts for the Yakima Basin are for natural flow. As such, they may differ from the U.S. Bureau of Reclamation's forecast for the total water supply available, which includes irrigation return flow. January streamflows within the basin were: the Yakima River near Kiona, 85% of average; the Yakima near Cle Elum, 62%; and the Naches River at 68%. February 1 snowpack was 112% based upon 21 snow courses and SNOTEL readings within the Yakima Basin. Precipitation was 134% of average for January and 112% for the water year-to-date.

For more information contact your local Natural Resources Conservation Service office.

Yakima River Basin

Streamflow Forecasts - February 1, 1998

Forecast Point	Forecast Period	<<----- Drier ----->>		Future Conditions		----->> Wetter ----->>		30-Yr Avg. (1000AF)
		Chance Of Exceeding *						
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
KEECHELUS LAKE INFLOW	APR-JUL	92	106	116	94	126	140	124
	APR-SEP	101	116	127	94	138	153	135
	APR-JUN	84	95	103	95	111	122	109
KACHESS LAKE INFLOW	APR-JUL	83	95	103	93	111	123	111
	APR-SEP	88	101	110	93	119	132	118
	APR-JUN	76	86	92	93	98	108	99
CLE ELUM LAKE INFLOW	APR-JUL	332	367	390	95	413	448	409
	APR-SEP	361	402	430	96	458	499	448
	APR-JUN	280	308	328	95	348	376	345
YAKIMA at Cle Elum	APR-JUN	564	627	670	93	713	776	721
	APR-JUL	651	725	775	93	825	899	832
	APR-SEP	715	795	850	93	905	985	915
BUMPING LAKE INFLOW	APR-SEP	107	122	133	98	144	159	136
	APR-JUL	101	115	124	100	133	147	124
	APR-JUN	82	95	104	100	113	126	104
AMERICAN RIVER near Nile	APR-SEP	121	134	142	120	150	163	118
	APR-JUL	110	121	129	118	137	148	109
	APR-JUN	81	91	99	107	106	116	92
RIMROCK LAKE INFLOW	APR-SEP	188	213	230	97	247	272	238
	APR-JUL	161	181	194	97	207	227	200
	APR-JUN	131	146	157	97	168	183	162
NACHES near Naches	APR-SEP	676	753	805	97	857	934	832
	APR-JUL	618	685	730	97	775	842	755
	APR-JUN	534	592	631	97	670	728	651
AHTANUM CREEK nr Tampico (2)	APR-SEP	25	37	44	96	52	63	46
	APR-JUL	24	34	41	98	48	58	42
	APR-JUN	20	29	35	97	41	50	36
YAKIMA near Parker	APR-SEP	1578	1770	1900	95	2030	2222	1994
	APR-JUL	1426	1598	1715	95	1832	2004	1805
	APR-JUN	1275	1421	1520	95	1619	1765	1597
KLiCKiTAT near Glenwood	APR-JUN	95	108	116	106	124	137	110
	APR-SEP	117	135	147	105	159	177	140

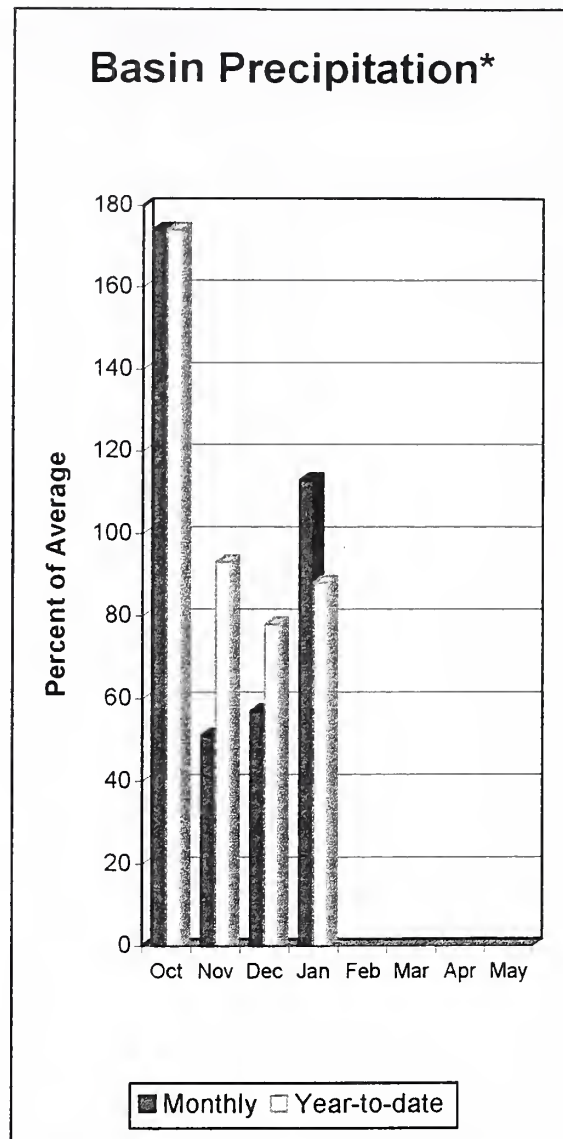
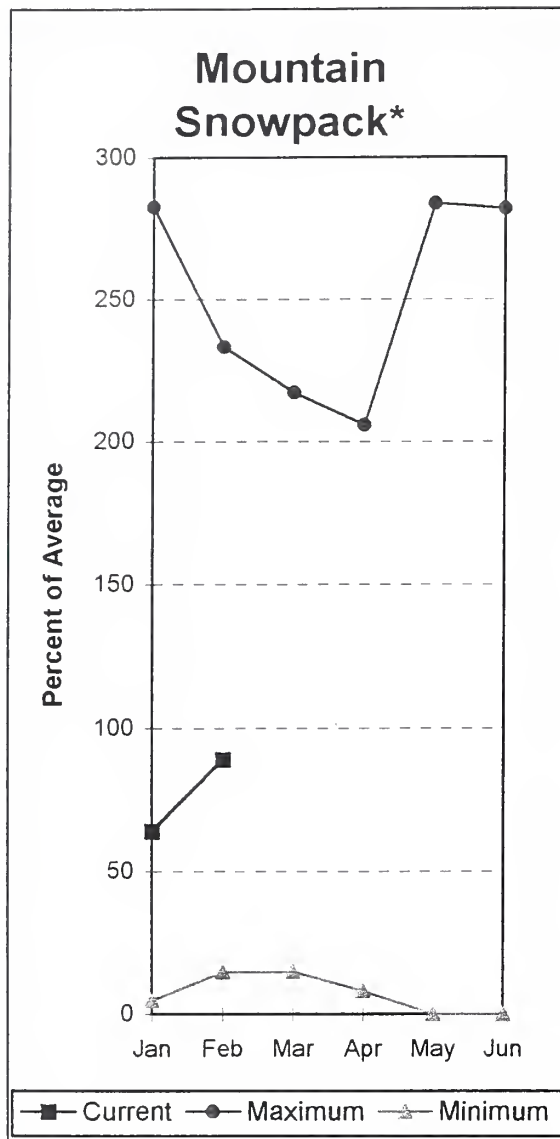
YAKIMA RIVER BASIN Reservoir Storage (1000 AF) - End of January					YAKIMA RIVER BASIN Watershed Snowpack Analysis - February 1, 1998			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
KEECHELUS	157.8	129.5	107.3	96.0	YAKIMA RIVER	21	60	112
KACHESS	239.0	166.3	95.8	170.0	AHTANUM CREEK	3	59	92
CLE ELUM	436.9	325.7	218.3	251.0				
BUMPING LAKE	33.7	8.6	8.6	9.0				
RIMROCK	198.0	133.9	131.9	115.0				

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
 (2) - The value is natural flow - actual flow may be affected by upstream water management.

Walla Walla River Basin



*Based on selected stations

January precipitation was 113% of average, bringing the year-to-date precipitation to 88% of average. February 1 snowpack was at 89% of average. The summer forecast is for 91% of average streamflow in the Snake River below Lower Granite Dam, 97% for the Grande Ronde at Troy, and 103% for Mill Creek. January streamflow was 130% of average for the Walla Walla River; 92% for the Snake River below Lower Granite Dam; and 80% for the Grande Ronde River near Troy. The Touchet SNOTEL site had 19 inches of snow-water-equivalent. The average February 1 reading for this site is 20.8 inches. Average temperatures were 3-4 degrees above normal for the area.

For more information contact your local Natural Resources Conservation Service office.

Walla Walla River Basin

Streamflow Forecasts - February 1, 1998

Forecast Point	Forecast Period	<<----- Drier ----- Future Conditions ----- Wetter ----->>						
		Chance Of Exceeding *		Chance Of Exceeding *		Chance Of Exceeding *		30-Yr Avg. (1000AF)
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
GRANDE RONDE at Troy (1)	MAR-JUL	852	1242	1420	97	1598	1988	1471
	APR-SEP	756	1109	1270	97	1431	1784	1312
SNAKE blw Lower Granite Dam (1,2)	APR-JUL	10385	16791	19700	91	22609	39015	21650
	APR-SEP	11731	18930	22200	91	25470	32669	24360
MILL CREEK at Walla Walla	APR-SEP	9.5	14.3	17.6	103	21	26	17.1
	APR-JUL	9.3	14.1	17.4	103	21	26	16.9
	APR-JUN	9.2	14.0	17.2	103	20	25	16.7
SF WALLA WALLA near Milton-Freewater	APR-JUL	42	48	53	99	57	64	53
	APR-SEP	53	61	66	99	71	78	66

WALLA WALLA RIVER BASIN					WALLA WALLA RIVER BASIN			
Reservoir Storage (1000 AF) - End of January					Watershed Snowpack Analysis - February 1, 1998			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
					WALLA WALLA RIVER	2	46	89

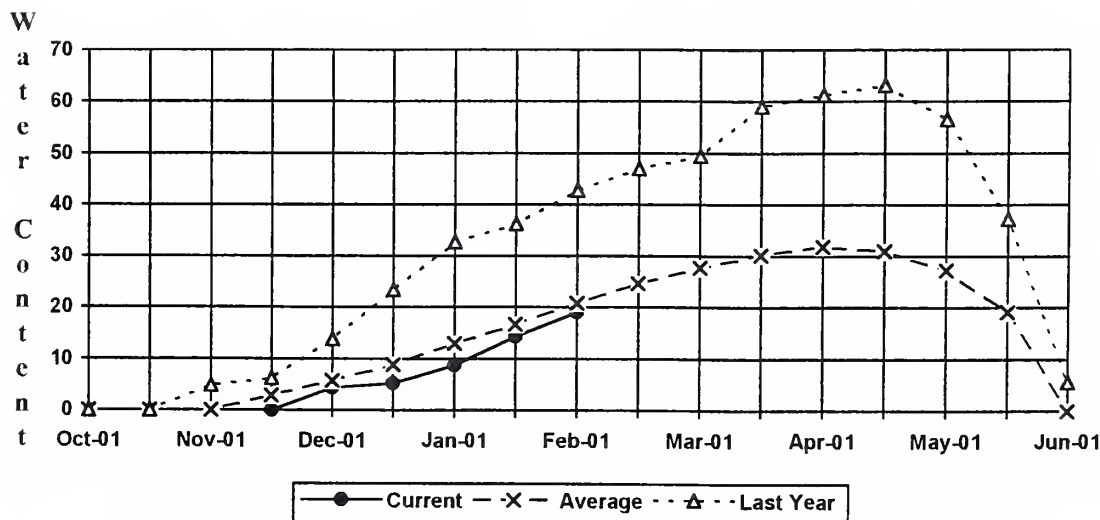
* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

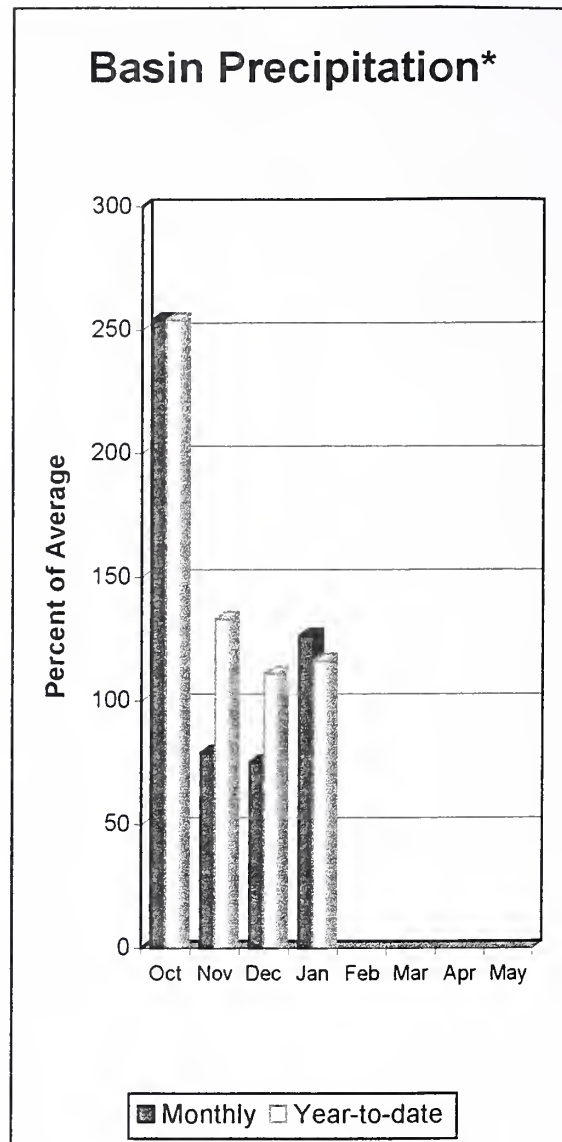
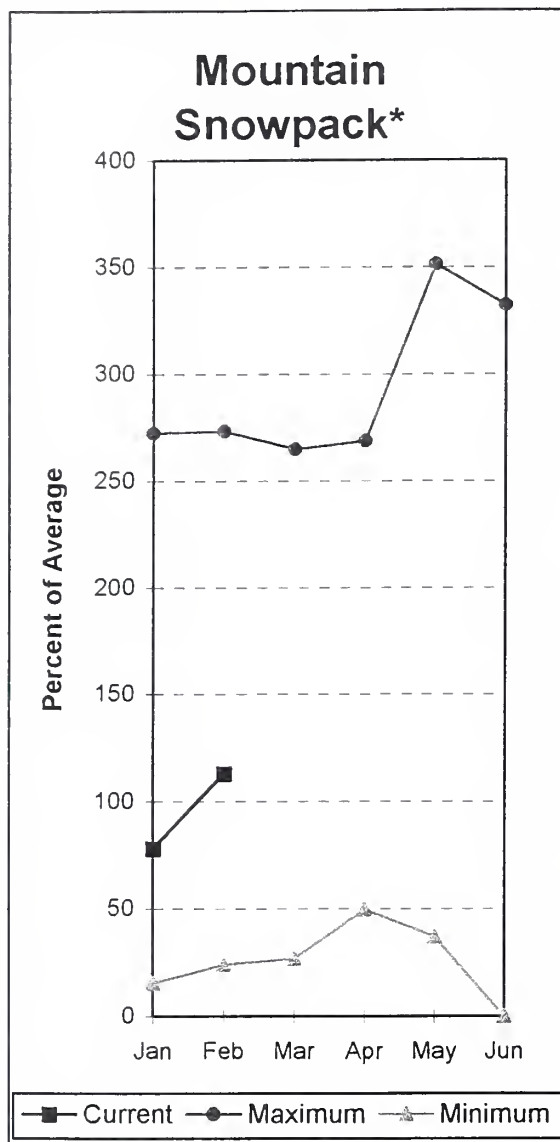
(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.

(2) - The value is natural flow - actual flow may be affected by upstream water management.

Touchet #2 SNOTEL Elevation 5530 ft.



Cowlitz - Lewis River Basins



*Based on selected stations

The forecast for summer runoff in the Lewis River Basin is 96% of average. The Cowlitz River at Castle Rock, is forecast for 93% of average runoff. January streamflow for the Cowlitz River was 98% of average, and 126% for the Lewis River. January precipitation was 126% of average, 116% of average for the water-year. February 1 snow cover for the Cowlitz River was 109%, and the Lewis River was 118% of average. The Paradise Park SNOTEL recorded the most water-content for the basin with 45.1 inches of water. Average February 1 water-content is 38.5 inches. Average temperatures were about 3 degrees above normal during January.

For more information contact your local Natural Resources Conservation Service office.

Cowlitz - Lewis River Basins

Streamflow Forecasts - February 1, 1998

		<<===== Drier ===== Future Conditions ===== Wetter =====>>						
Forecast Point	Forecast Period	Chance Of Exceeding *						30-Yr Avg. (1000AF)
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
=====								
LEWIS at Ariel (2)	APR-JUL	717	891	1010	96	1129	1303	1053
	APR-SEP	857	1038	1160	96	1282	1463	1206
	APR-JUN	624	788	900	96	1012	1176	935
COWLITZ R. bl Mayfield Dam (2)	APR-SEP	1082	1575	1910	97	2245	2738	1970
	APR-JUL	954	1386	1680	97	1974	2406	1731
	APR-JUN	810	1179	1430	97	1681	2050	1477
COWLITZ R. at Castle Rock (2)	APR-SEP	1600	2124	2480	93	2836	3360	2667
	APR-JUL	1392	1849	2160	93	2471	2928	2325
	APR-JUN	1195	1588	1855	93	2122	2515	1995
KCLICKITAT near Glenwood	APR-JUN	95	108	116	106	124	137	110
	APR-SEP	117	135	147	105	159	177	140

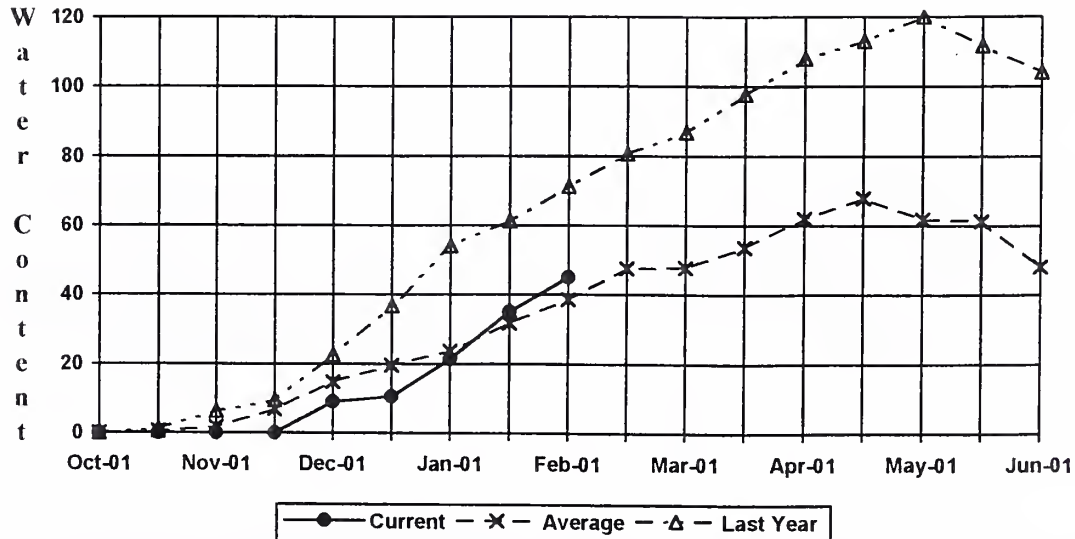
COWLITZ - LEWIS RIVER BASINS					COWLITZ - LEWIS RIVER BASINS			
Reservoir Storage (1000 AF) - End of January					Watershed Snowpack Analysis - February 1, 1998			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
					LEWIS RIVER	4	69	118
					COWLITZ RIVER	7	63	109

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

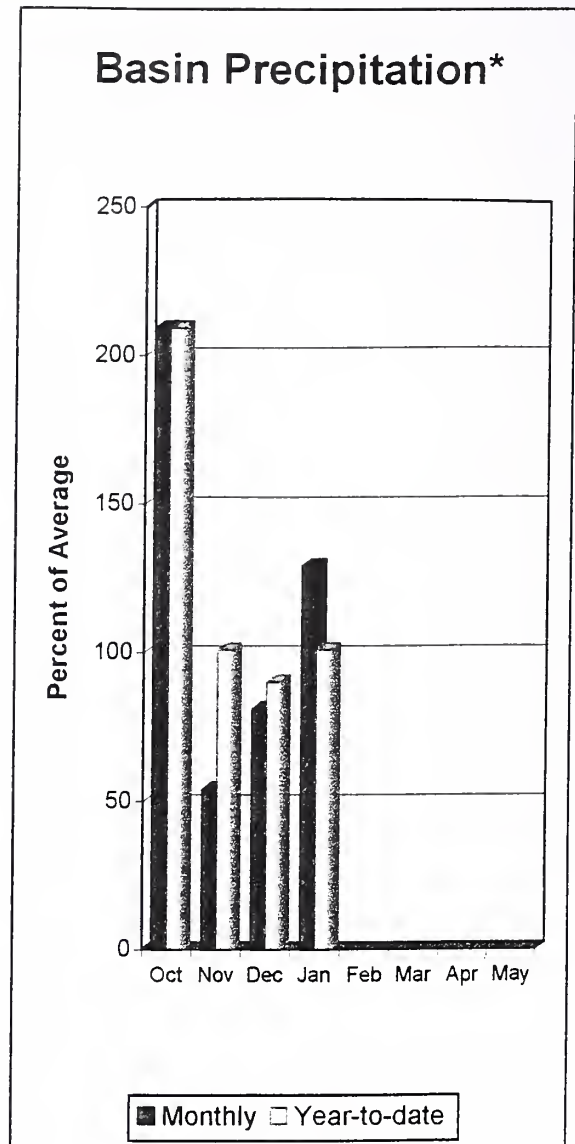
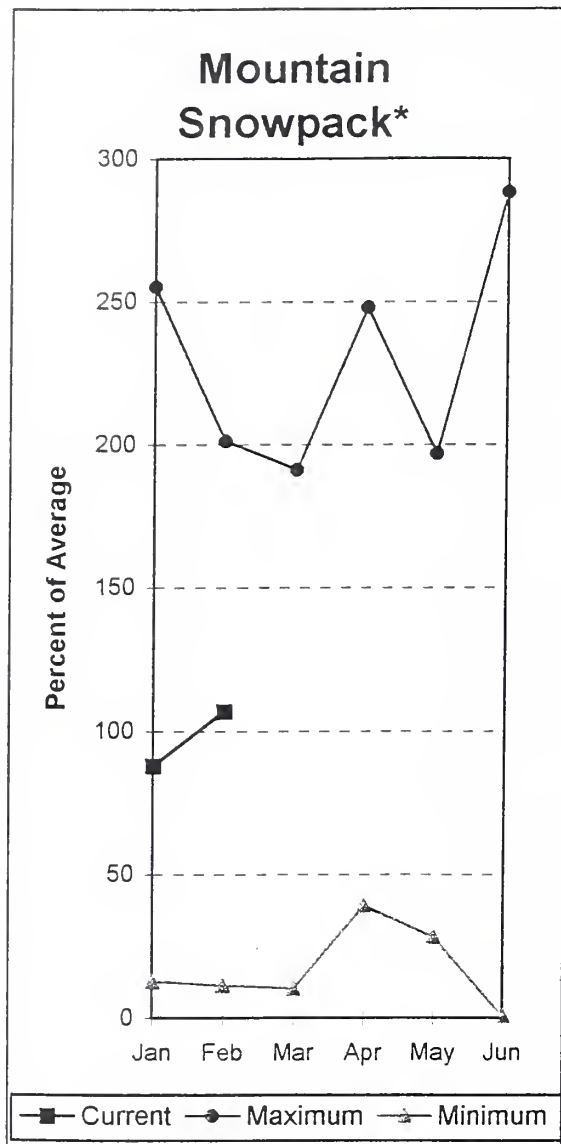
The average is computed for the 1961-1990 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
 (2) - The value is natural flow - actual flow may be affected by upstream water management.

Paridise SNOTEL Elevation 5120 ft.



White - Green River Basins



*Based on selected stations

Summer runoff is forecast to be 84% of average for the Green River. The White and Nisqually rivers should also experience near to slightly below normal flows this summer. February 1 snowpack was 124% of average in the White River Basin; and 89% in the Green River Basin. Water-content on February 1 at the Morse Lake SNOTEL, at an elevation of 5,400 feet, was 43.4 inches. This site has a February 1 average of 29.6 inches. January precipitation was 129% of average, bringing the water year-to-date to 101% of average for the basins.

For more information contact your local Natural Resources Conservation Service office.

White - Green River Basins

Streamflow Forecasts - February 1, 1998

		<<----- Drier -----		Future Conditions -----		Wetter ----->>			
Forecast Point	Forecast Period	Chance Of Exceeding *						30-Yr Avg. (1000AF)	
		90%	70%	50% (Most Probable)		30%	10%		
		(1000AF)	(1000AF)	(1000AF)	(% AVG.)	(1000AF)	(1000AF)		
GREEN RIVER below Howard Hanson Dam		APR-JUL	154	189	213	83	237	272	257
		APR-SEP	178	214	238	84	262	298	285
		APR-JUN	139	172	195	83	218	251	234

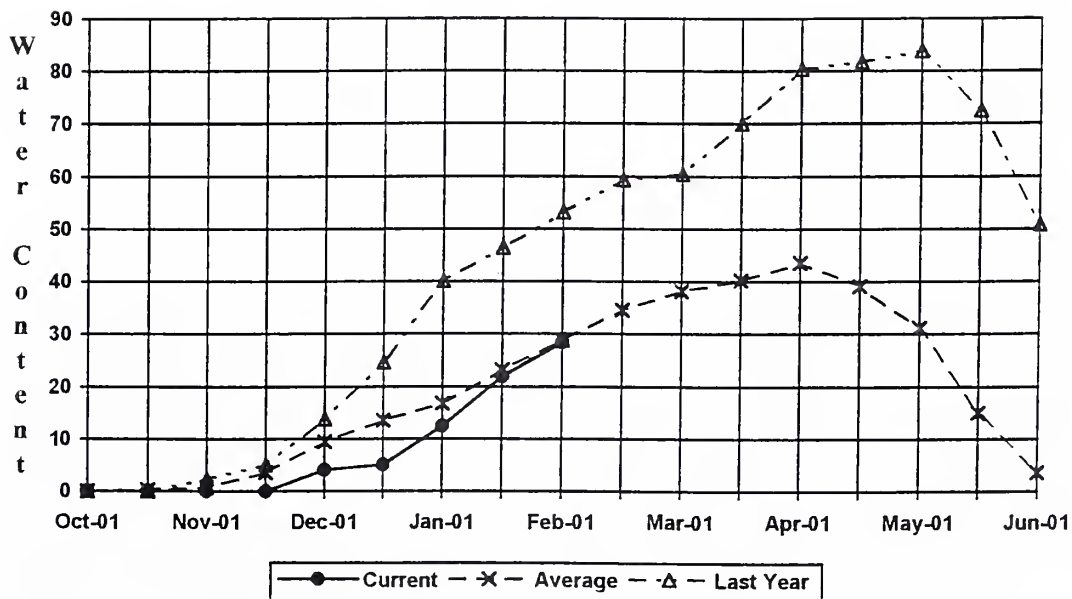
WHITE - GREEN RIVER BASINS					WHITE - GREEN RIVER BASINS			
Reservoir Storage (1000 AF) - End of January					Watershed Snowpack Analysis - February 1, 1998			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
					WHITE RIVER	3	65	124
					GREEN RIVER	7	55	89

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

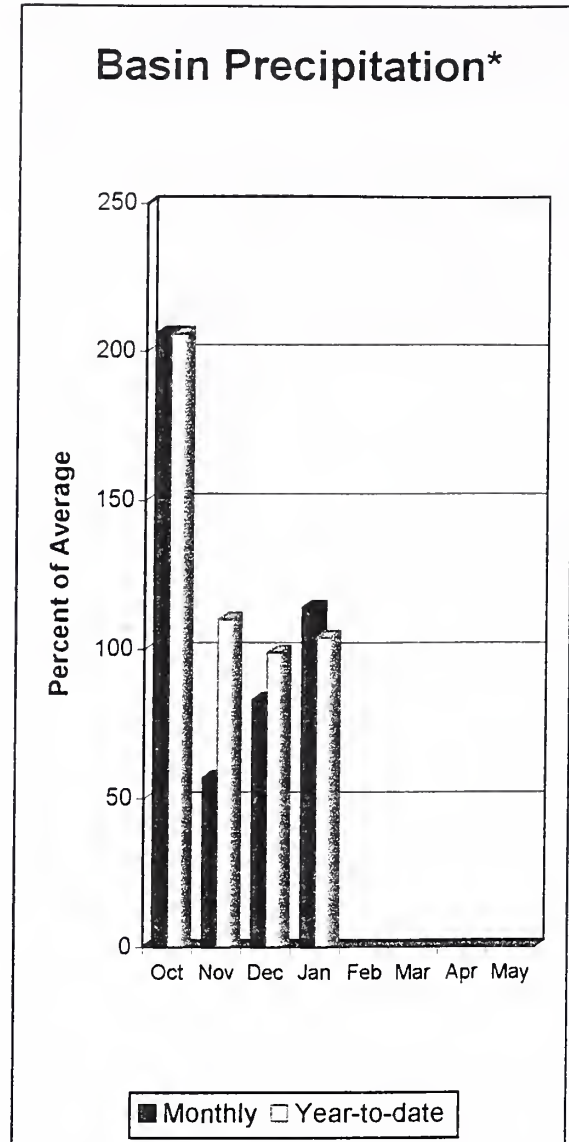
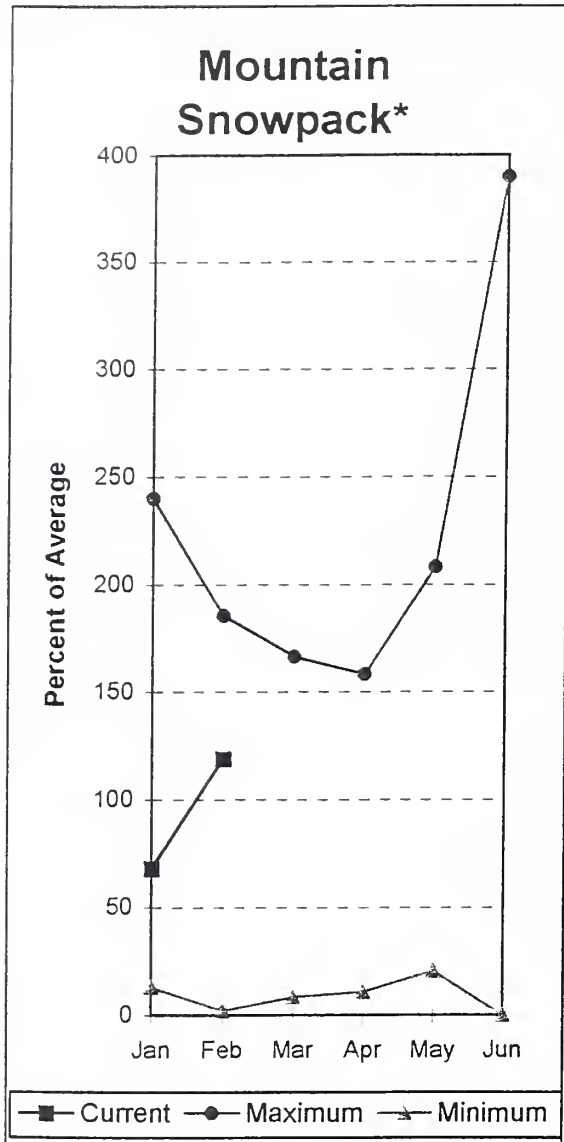
The average is computed for the 1961-1990 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
 (2) - The value is natural flow - actual flow may be affected by upstream water management.

Stampede Pass SNOTEL Elevation 3860 ft.



Central Puget Sound River Basins



*Based on selected stations

Forecast for spring and summer flows are: 88% for the Cedar River near Cedar Falls; 87% for the Rex River; 88% for the South Fork of the Tolt River; and 80% for the Cedar River at Cedar Falls. Basin-wide precipitation for January was 114% of average, bringing water-year-to-date to 104% of average. February 1 snow cover in the Cedar River Basin was 134%; the Tolt River Basin was 112%; the Snoqualmie River Basin was 106%; and the Skykomish River Basin was 125% of average. Stevens Pass SNOTEL, at 4,070 feet, had 27.7 inches of water content. Average February 1 water content is 27.3 inches. January temperatures were 2 degrees above normal.

For more information contact your local Natural Resources Conservation Service office.

Central Puget Sound River Basins

Streamflow Forecasts - February 1, 1998

Forecast Point	Forecast Period	<----- Drier ----- Future Conditions ----- Wetter ----->						
		90% 70%		Chance Of Exceeding *		30% 10%		30-Yr Avg.
		(1000AF)	(1000AF)	50% (Most Probable)	(% AVG.)	(1000AF)	(1000AF)	
CEDAR near Cedar Falls	APR-JUL	48	59	67	87	75	86	77
	APR-SEP	54	66	74	88	82	94	84
	APR-JUN	44	54	60	89	67	76	68
REX near Cedar Falls	APR-JUL	14.8	19.9	23	86	27	32	27
	APR-SEP	17.2	23	26	87	30	35	30
	APR-JUN	13.4	18.1	21	86	24	29	25
CEDAR RIVER at Cedar Falls	APR-JUL	37	54	66	81	78	95	82
	APR-SEP	38	55	67	80	78	95	83
	APR-JUN	38	54	64	80	74	90	80
SOUTH FORK TOLT near Index	APR-JUL	10.0	12.0	13.3	88	14.6	16.6	15.2
	APR-SEP	12.2	14.3	15.7	88	17.1	19.2	17.8
	APR-JUN	8.7	10.6	11.8	90	13.0	14.9	13.1

CENTRAL PUGET SOUND RIVER BASINS Reservoir Storage (1000 AF) - End of January

Reservoir	Usable Capacity	*** Usable Storage ***		
		This Year	Last Year	Avg

CENTRAL PUGET SOUND RIVER BASINS Watershed Snowpack Analysis - February 1, 1998

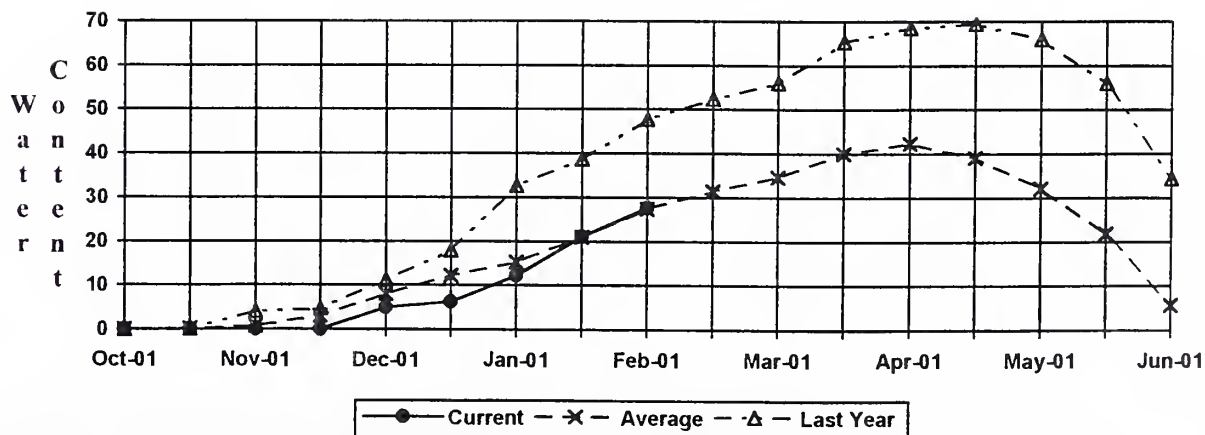
Watershed	Number of Data Sites	This Year as % of	
		Last Yr	Average
CEDAR RIVER	4	66	134
TOLT RIVER	2	79	112
SNOQUALMIE RIVER	5	63	106
SKYKOMISH RIVER	3	65	125

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

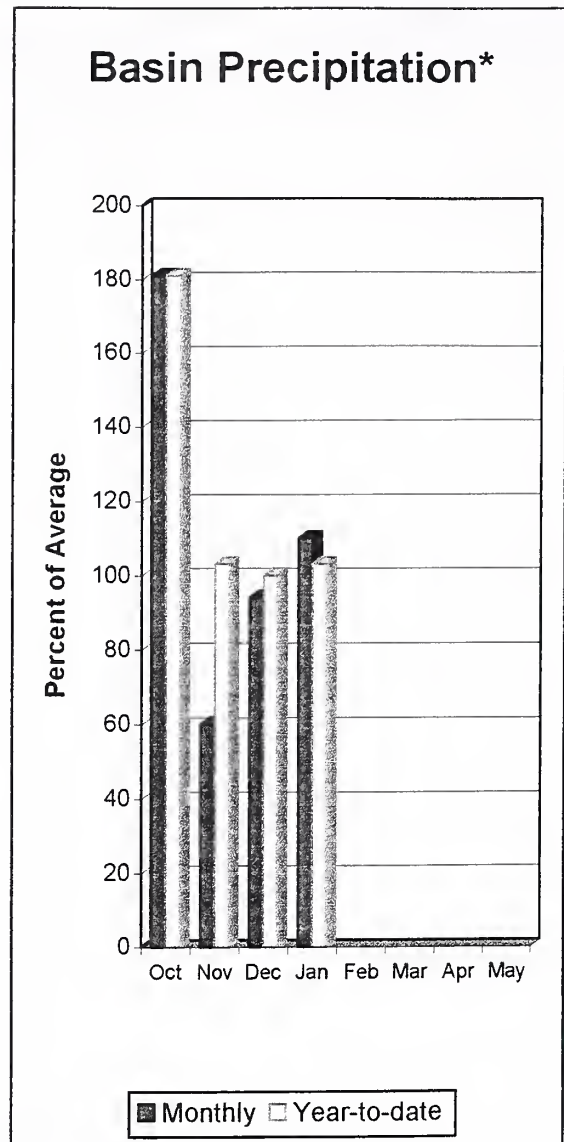
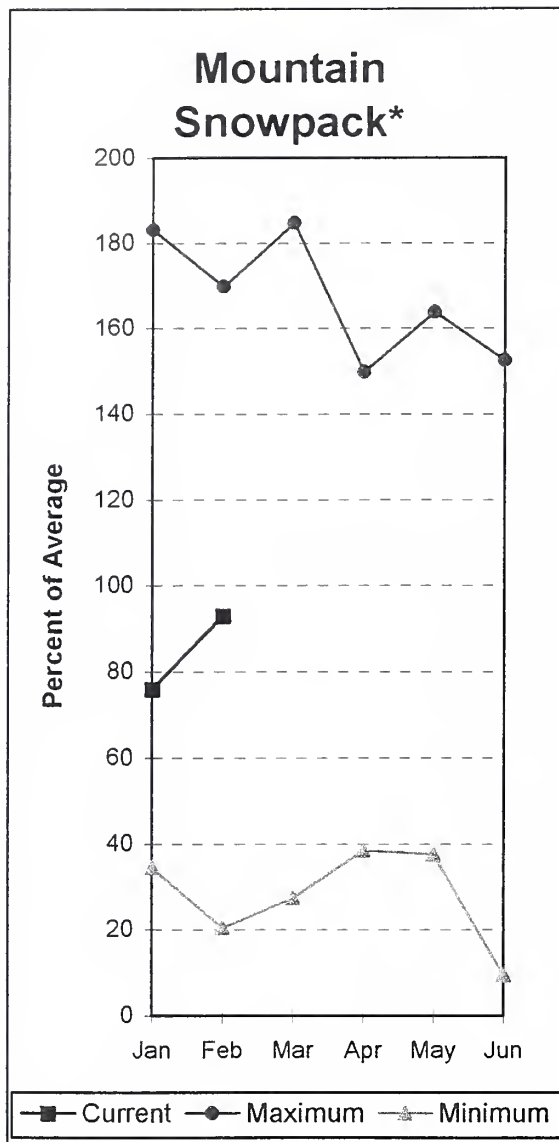
The average is computed for the 1961-1990 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
 (2) - The value is natural flow - actual flow may be affected by upstream water management.

Stevens Pass SNOTEL Elevation 4070 ft.



North Puget Sound River Basins



*Based on selected stations

Forecast for the Skagit River streamflow is for 97% of average for the spring and summer period. January streamflow in the Skagit River was 91% of average. Other forecast points included the Baker River at 100%; and Thunder Creek at 97% of average. Basin-wide precipitation for January was 110% of average, bringing water-year-to-date to 103% of average. February 1 snow cover in the Skagit River Basin was 104%; the Baker River Basin was 111%; and the Nooksack River Basin was 65% of average. Rainy Pass SNOTEL, at 4,780 feet, had 24.9 inches of water content. Average February 1 water content is 24.5 inches. February 1 Skagit River reservoir storage was 95% average and 71% of capacity. Average January temperatures were about 4 degrees above normal for the basin.

For more information contact your local Natural Resources Conservation Service office.

North Puget Sound River Basins

Streamflow Forecasts - February 1, 1998

		<<===== Drier =====		Future Conditions		===== Wetter =====>>		
Forecast Point	Forecast Period	Chance Of Exceeding *						30-Yr Avg. (1000AF)
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
=====								
THUNDER CREEK near Newhalem	APR-JUL	197	212	222	97	232	247	230
	APR-SEP	288	306	318	97	330	348	328
	APR-JUN	115	133	145	97	157	175	149
=====								
SKAGIT near Newhalem (2)	APR-JUL	1589	1726	1820	97	1914	2051	1879
	APR-SEP	1881	2023	2119	97	2215	2357	2191
	APR-JUN	1287	1392	1463	101	1534	1639	1455
=====								
BAKER RIVER near Concrete	APR-JUL	712	786	837	100	888	962	836
	APR-SEP	907	998	1060	100	1122	1213	1064
	APR-JUN	505	569	612	100	655	719	611

NORTH PUGET SOUND RIVER BASINS					NORTH PUGET SOUND RIVER BASINS			
Reservoir Storage (1000 AF) - End of January					Watershed Snowpack Analysis - February 1, 1998			
Reservoir	Usable Capacity	*** This Year	Usable Storage Last Year	*** Avg	Watershed	Number of Data Sites	This Year as % of Last Yr Average	
ROSS	1404.1	981.0	1011.8	1033.9	SKAGIT RIVER	13	62	104
DIABLO RESERVOIR	90.6	86.5	86.3	84.2	BAKER RIVER	2	81	111
GORGE RESERVOIR	9.8	7.4	7.4	7.9	NOOKSACK RIVER	2	61	65

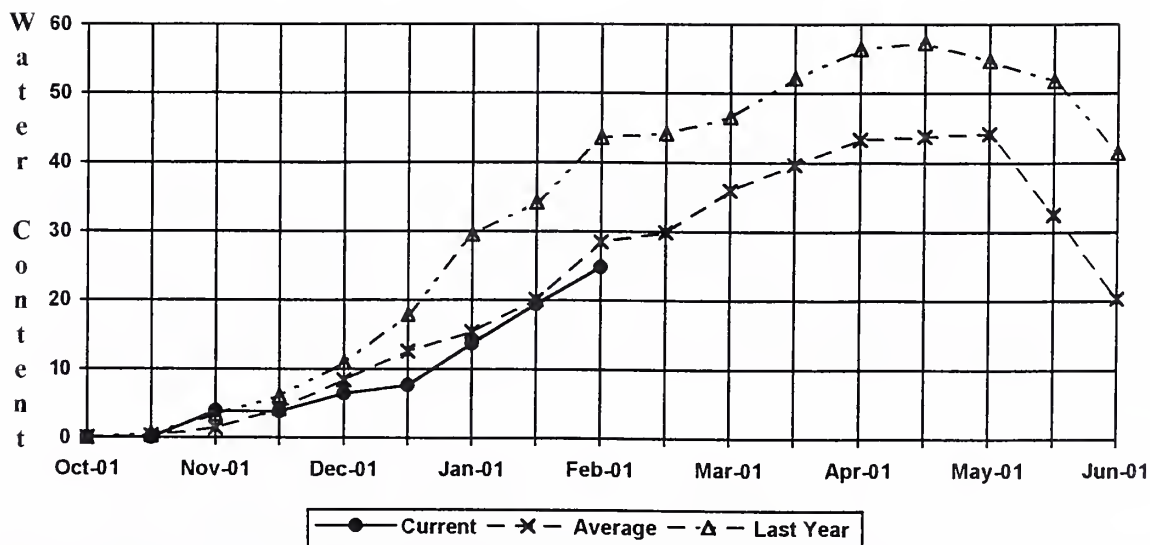
* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

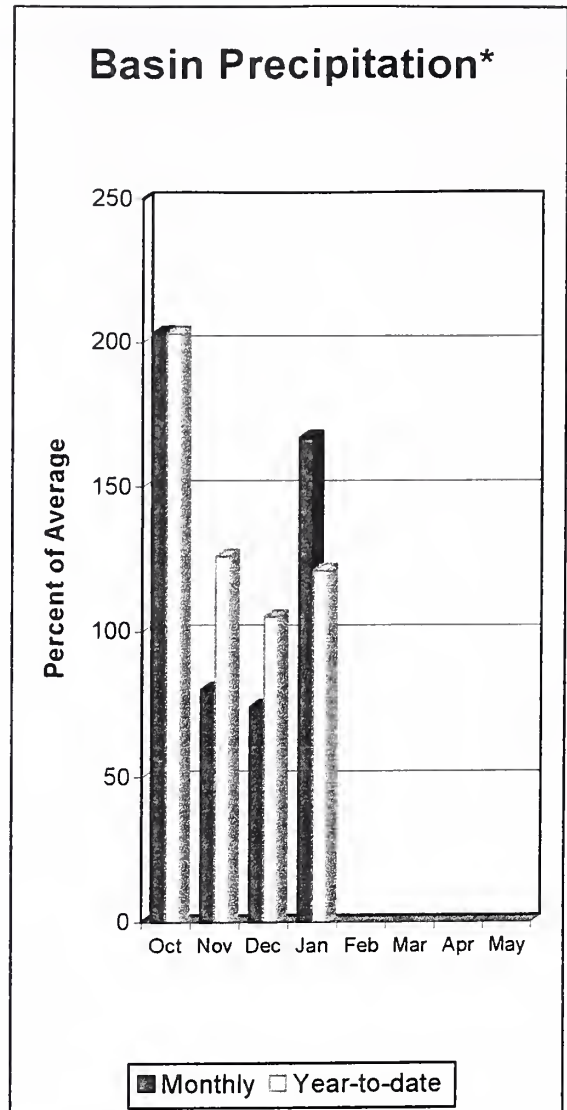
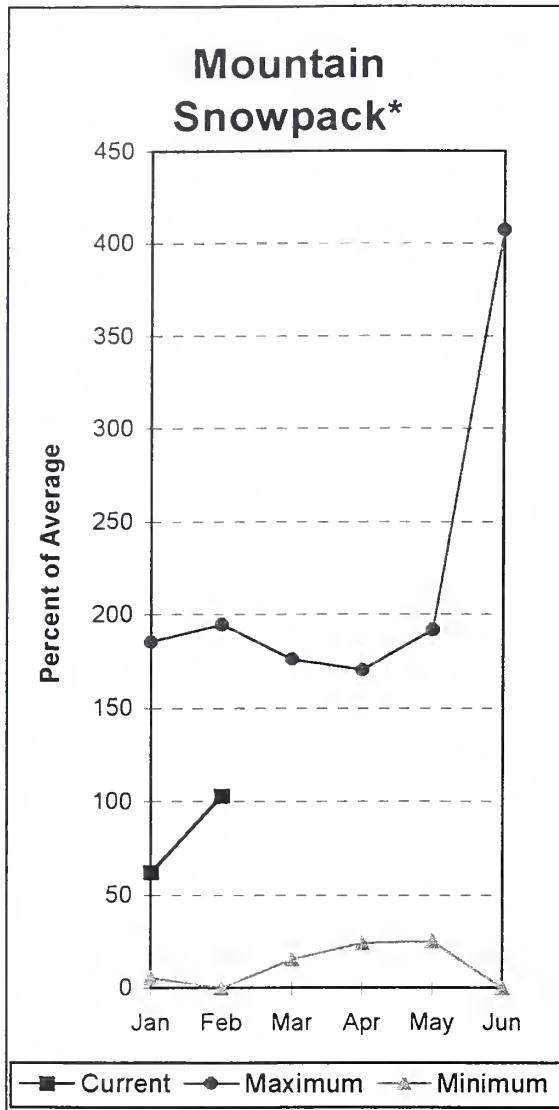
(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.

(2) - The value is natural flow - actual flow may be affected by upstream water management.

Rainy Pass SNOTEL Elevation 4780 ft.



Olympic Peninsula River Basins



*Based on selected stations

February forecasts of runoff for streamflow in the Dungeness River Basin are 97% of average and 97% of average for the Elwha River. The Big Quilcene and Wynoochee rivers can expect near average runoff this summer also. January precipitation was 167% of average. Precipitation has accumulated at 121% of average for the water year. January precipitation at Quillayute was 19.2 inches. The thirty-year average for February 1 is 14.65 inches. Average February 1 snow cover in the Olympic Basin was at 103% of average. The Mount Crag SNOTEL near Quilcene had 21.6 inches of snow-water-equivalent on February 1. Average for this site is 16.9 inches. Temperatures were 3 degrees above average for the month.

For more information contact your local Natural Resources Conservation Service office.

Olympic Peninsula River Basins

Streamflow Forecasts - February 1, 1998

Forecast Point	Forecast Period	<<===== Drier ===== Future Conditions ===== Wetter =====>>						
		Chance Of Exceeding *						30-Yr Avg. (1000AF)
		90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	
DUNGENESS near Sequim	APR-SEP	131	141	148	97	155	165	153
	APR-JUL	110	118	123	98	128	136	125
	APR-JUN	78	87	92	98	98	107	94
ELWHA near Port Angeles	APR-SEP	429	469	496	97	523	563	510
	APR-JUL	360	391	412	97	433	464	424

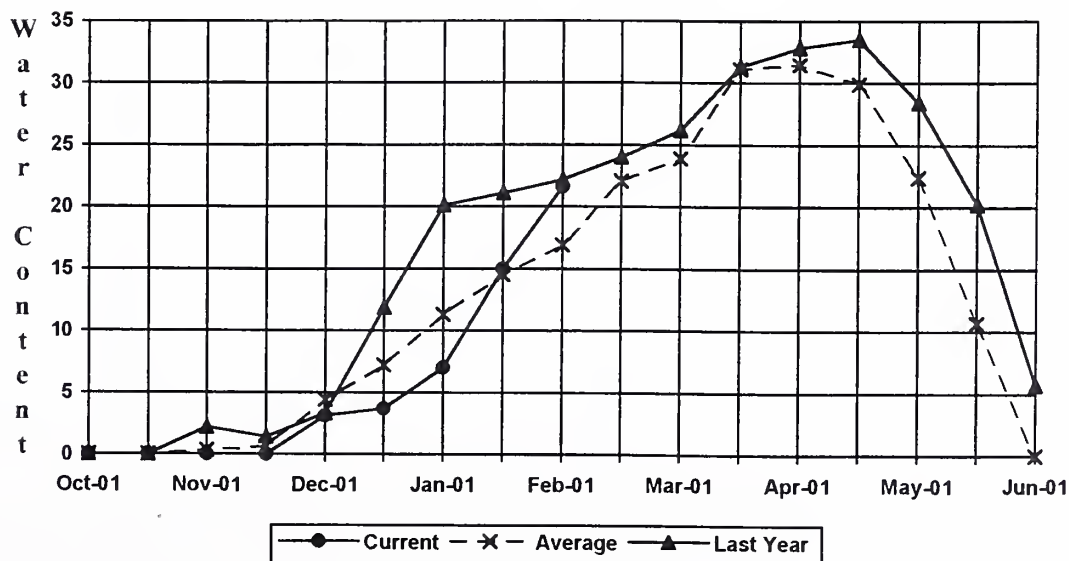
OLYMPIC PENINSULA RIVER BASINS Reservoir Storage (1000 AF) - End of January					OLYMPIC PENINSULA RIVER BASINS Watershed Snowpack Analysis - February 1, 1998			
Reservoir	Usable Capacity	*** Usable Storage ***			Watershed	Number of Data Sites	This Year as % of	
		This Year	Last Year	Avg			Last Yr	Average
					ELWHA RIVER	1	75	81
					MORSE CREEK	1	89	112
					DUNGENESS RIVER	1	90	90
					QUILCENE RIVER	1	98	128
					WYNOOCHEE RIVER	0	0	0

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
 (2) - The value is natural flow - actual flow may be affected by upstream water management.

Mount Crag SNOTEL Elevation 4050 ft.



Issued by

Thomas Weber
Acting Chief
Natural Resources Conservation Service
U.S. Department of Agriculture

Released by

Frank Easter
Acting State Conservationist
Natural Resources Conservation Service
Spokane, Washington

The Following Organizations Cooperate with the Natural Resources Conservation Service in Snow Survey Work*:

Canada	Ministry of the Environment Investigations Branch, Victoria, British Columbia
State	Washington State Department of Ecology Washington State Department of Natural Resources
Federal	Department of the Army Corps of Engineers U.S. Department of Agriculture Forest Service U.S. Department of Commerce NOAA, National Weather Service U.S. Department of Interior Bonneville Power Administration Bureau of Reclamation Geological Survey National Park Service Bureau of Indian Affairs
Local	City of Tacoma City of Seattle Chelan County P.U.D. Pacific Power and Light Company Puget Sound Power and Light Company Washington Water Power Company Snohomish County P.U.D. Colville Confederated Tribes Spokane County Yakama Indian Nation Whatcom County Pierce County
Private	Okanogan Irrigation District Wenatchee Heights Irrigation District Newman Lake Homeowners Association Whitestone Reclamation District

*Other organizations and individuals furnish valuable information for the snow survey reports. Their cooperation is gratefully acknowledged.



Rock Pointe Tower II, Suite 450
W. 316 Boone Avenue
Spokane, WA 99201-2349

FOR OFFICIAL USE ONLY

U. S. DEPT. OF AGRICULTURE
NATIONAL AGRICUL. LIBRARY
CURRENT SERIAL RECORDS
ROOM 002
BELTSVILLE, MD 20705-2351



Washington
Basin Outlook Report
Natural Resources Conservation Service
Spokane, WA

